CLAIMS

1. A heat exchanger comprising a refrigerant inflow header and a refrigerant outflow header arranged side by side in the direction of flow of air through the exchanger with partitioning means provided therebetween and elongated laterally of the heat exchanger, and a plurality of heat exchange tubes joined to each of the headers, the two headers being in communication with each other through a refrigerant passing hole formed in the partitioning means, each of the heat exchange tubes being joined to the header with an end portion thereof inserted in the header, a refrigerant being flowable into the inflow header from the heat exchange tubes joined thereto and then into the outflow header through the refrigerant passing hole to flow out of the outflow header into the heat exchange tubes joined thereto, the heat exchange tubes joined to the inflow header having their end portions inserted in the inflow header and projected outward beyond the refrigerant passing hole of the partitioning means longitudinally of the tubes.

2. A heat exchanger according to claim 1 wherein the partitioning means has a plurality of refrigerant passing holes formed therein and arranged at a spacing longitudinally thereof, and each of the heat exchange tubes joined to the inflow header being in the same position as the corresponding refrigerant passing hole of the partitioning means with respect to the longitudinal direction of the inflow header.

3. A heat exchanger according to claim 1 wherein the partitioning means has a plurality of refrigerant passing holes formed therein and arranged at a spacing longitudinally thereof,

and the heat exchange tubes joined to the inflow header are positioned between respective adjacent pairs of refrigerant passing holes of the partitioning means.

4. A heat exchanger according to claim 1 wherein the heat exchange tubes joined to the outflow header have their end portions inserted in the outflow header and projected outward beyond the refrigerant passing hole of the partitioning means longitudinally of the tubes.

5. A heat exchanger according to claim 1 wherein the partitioning means has two refrigerant barrier portions formed respectively at opposite end portions thereof, and a plurality of refrigerant passing holes are formed in the partitioning means between the two refrigerant barrier portions.

6. A heat exchanger according to claim 1 wherein the inflow header and the outflow header are provided by dividing interior of a refrigerant turn tank by the partitioning means, and the turn tank comprises a first member having the heat exchange tubes joined thereto and a second member brazed to the first member at a portion thereof opposite to the heat exchange tubes, the partitioning means being integral with the second member.

7. A heat exchanger according to claim 6 which comprises a heat exchange core composed of a plurality of tube groups arranged in rows as spaced forwardly or rearwardly of the exchanger, each of the tube groups comprising a plurality of heat exchange tubes arranged at a spacing laterally of the exchanger, a refrigerant inlet header disposed at one end of the heat exchange core and having joined thereto the heat exchange tubes of tube group in at least one row, and a refrigerant

outlet header disposed at said one end of the heat exchange core and in the rear of the inlet header and having joined thereto the heat exchange tubes of tube group in at least one row, the turn tank being disposed at the other end of the heat exchange core, the heat exchange tubes joined to the inlet header being joined to inflow header, the heat exchange tubes joined to the outlet header being joined to the outflow header, the refrigerant as positioned in the inlet header being flowable into the inflow header through the heat exchange tubes joined thereto, then into the outflow header through the refrigerant passing hole, and thereafter into the outlet header through the heat exchange tubes joined thereto.

8. A heat exchanger according to claim 7 wherein the inlet header is provided at one end thereof with a refrigerant inlet, and the outlet header has a refrigerant outlet at one end thereof alongside the refrigerant inlet.

9. A heat exchanger according to claim 7 wherein interior of the outlet header is divided by separating means into a first and a second space arranged in the direction of height, the heat exchange tubes joined to the outlet header being in communication with the first space, the separating means having a refrigerant passing hole formed therein, and the refrigerant flows out of the second space of the outlet header.

10. A heat exchanger according to claim 7 wherein the inlet header and the outlet header are provided by dividing interior of a refrigerant inlet-outlet tank into a front and a rear space by partitioning means.

11. A heat exchanger according to claim 7 wherein the

inlet header and the outlet header are provided by dividing interior of a refrigerant inlet-outlet tank into a front and a rear space by partitioning means, and interior of the outlet header is divided by separating means into a first and a second space arranged in the direction of height, the heat exchange tubes joined to the outlet header being in communication with the first space, the separating means having a refrigerant passing hole formed therein, the refrigerant being flowable out of the second space of the outlet header, the inlet-outlet tank comprising a first member having the heat exchange tubes joined thereto and a second member brazed to the first member at a portion thereof opposite to the heat exchange tubes, the partitioning means and the separating means being integral with the second member.

12. A heat exchanger according to claim 7 wherein each of the tube groups comprises at least seven heat exchange tubes.

13. A heat exchanger according to claim 1 which comprises a heat exchange core composed of a plurality of tube groups arranged in rows as spaced forwardly or rearwardly of the exchanger and each comprising a plurality of heat exchange tubes arranged at a spacing laterally of the evaporator, front and rear two headers arranged at one end of the heat exchange core and each having joined thereto the heat exchange tubes of tube group in at least one row, and a hollow body disposed at the other end of the heat exchange core and having all the heat exchange tubes joined thereto, each of the headers comprising a plurality of header portions arranged longitudinally thereof, the hollow body comprising a plurality

of tanks arranged longitudinally thereof, each of the tanks having interior divided into front and rear two header portions by partitioning means, the header portions of the front and rear two headers being opposed to the respective header portions of the hollow body, each opposed pair of header portions having joined thereto opposite end portions of the heat exchange tubes, the two header portions of at least one of the tanks constituting the hollow body being the inflow header and the outflow header.

14. A heat exchanger according to claim 13 wherein the refrigerant flows into one end of one of the two header portions of the front and rear headers which header portions are opposed respectively to the inflow header and the outflow header, and the refrigerant flows out of one end of the other header portion which end is positioned alongside said one end.

15. A heat exchanger according to claim 13 wherein all the tanks of the hollow body are formed integrally, and the hollow body comprises a first member having the heat exchange tubes joined thereto, and a second member brazed to the first member at a portion thereof opposite to the heat exchange tubes, the partitioning means being integral with the second member.

16. A heat exchanger according to claim 13 wherein the front header and the rear header are provided by dividing a hollow body into a front and a rear portions by partitioning means.

17. A heat exchanger according to claim 16 wherein the hollow body having the front and rear headers comprises a first member having the heat exchange tubes joined thereto, and a second member brazed to the first member at a portion thereof

opposite to the heat exchange tubes, the partitioning means being integral with the second member.

18. A heat exchanger according to claim 13 wherein the number of heat exchange tubes joined to each of the inflow header and the outflow header is at least seven.

19. A refrigeration cycle comprising a compressor, a condenser and an evaporator, the evaporator comprising a heat exchanger according to any one of claims 1 to 18.

20. A vehicle having installed therein a refrigeration cycle according to claim 19 as a motor vehicle air conditioner.

21. A heat exchanger comprising a refrigerant inlet header and a refrigerant outlet header arranged side by side forwardly or rearwardly of the exchanger, and a refrigerant circulation passage for holding the two headers in communication, the circulation passage being provided by a plurality of intermediate headers and a plurality of heat exchange tubes, the inlet header being opposed to one of the intermediate headers, the outlet header being opposed to another one of the intermediate headers, a group of heat exchange tubes arranged at a spacing laterally of the exchanger in at least one row between each of the opposed pairs of headers, the group of heat exchange tubes having opposite tube end portions joined to each opposed pair of headers, a refrigerant flowing into the inlet header being returnable to the outlet header through the circulation passage and flowable out of the outlet header,

the outlet header having interior divided by separating means into a plurality of spaces arranged in the direction of height, the heat exchange tubes joined to the outlet header being in

communication with one of the spaces, a refrigerant outlet being provided in communication with another one of the spaces, the separating means having a plurality of refrigerant passing holes formed therein, the refrigerant passing holes being positioned between respective adjacent pairs of heat exchange tubes arranged longitudinally of the outlet header and included in the group of heat exchange tubes joined to the outlet header.

22. A heat exchanger according to claim 21 wherein the outlet header has its interior divided by the separating means into two spaces arranged in the direction of height.

23. A heat exchanger according to claim 21 wherein the intermediate headers are two in number, the intermediate header opposed to the inlet header serving as a refrigerant inflow header, the intermediate header opposed to the outlet header serving as a refrigerant outflow header, the inflow header being in communication with the outflow header, the refrigerant flowing into the inlet header being flowable into the inflow header through the heat exchange tubes joined to the inlet header, then into the outflow header, where the refrigerant changes its course to flow into said one space of the outlet header through the heat exchange tubes joined to the outlet header and then into said another space through the refrigerant passing holes of the separating means, the refrigerant thereafter being flowable out of the outlet header.

24. A heat exchanger according to claim 21 wherein the separating means of the outlet header has the refrigerant passing holes formed in a portion thereof other than opposite end

portions thereof with respect to the longitudinal direction of the outlet header.

25. A heat exchanger according to claim 21 wherein the inlet header has a refrigerant inlet at one end thereof, and the outlet header has the refrigerant outlet at one end thereof alongside the inlet end.

26. A heat exchanger according to claim 21 wherein the refrigerant passing holes are formed in the separating means of the outlet header in a rear portion thereof.

27. A heat exchanger according to claim 21 wherein the heat exchange tubes joined to the outlet header are at least ten in number.

28. A heat exchanger according to claim 21 wherein the inlet header and the outlet header are provided by dividing interior of a refrigerant inlet-outlet tank into a front and a rear space by partitioning means.

29. A heat exchanger according to claim 28 wherein the inlet-outlet tank comprises a first member having the heat exchange tubes joined thereto, a second member brazed to the first member at a portion thereof opposite to the heat exchange tubes and caps brazed to opposite ends of the first and second members, and the separating means and the partitioning means are integral with the second member.

30. A refrigeration cycle comprising a compressor, a condenser and an evaporator, the evaporator comprising a heat exchanger according to any one of claims 21 to 29.

31. A vehicle having installed therein a refrigeration cycle according to claim 30 as a motor vehicle air conditioner.

32. A heat exchanger comprising a heat exchange core composed of tube groups in the form of a plurality of rows arranged in the direction of flow of air through the exchanger, each of the tube groups comprising a plurality of heat exchange tubes arranged at a spacing in a left-right direction, a refrigerant inlet header positioned toward one end of each heat exchange tube and having joined thereto the heat exchange tubes of the tube group of at least one row, a refrigerant outlet header disposed toward said one end of each heat exchange tube and in the rear of the inlet header, the outlet header having joined thereto the heat exchange tubes of the tube group of at least one row, two refrigerant inflow headers positioned toward the other end of each heat exchange tube and aligned in the left-right direction, the inflow headers having joined thereto the heat exchange tubes joined to the inlet header, and two refrigerant outflow headers positioned toward said other end of each heat exchange tube and aligned in the left-right direction in the rear of the inflow headers, the outflow headers having joined thereto the heat exchange tubes joined to the outlet header, the inflow header at the left communicating with the outflow header at the right, the inflow header at the right communicating with the outflow header at the left.

33. A heat exchanger according to claim 32 wherein the inlet header has a refrigerant inlet at one end thereof, and the outlet header has a refrigerant outlet at one end thereof alongside the inlet end.

34. A heat exchanger according to claim 32 wherein the inflow header and the outflow header on each of the left and

right sides are provided by dividing interior of one tank into a front and a rear portion by partitioning means.

35. A heat exchanger according to claim 34 wherein a refrigerant flow crossing device is provided between the left tank and the right tank for causing the inflow header of the left tank to communicate with the outflow tank of the right tank, and the inflow header of the right tank to communicate with the outflow tank of the left tank.

36. A heat exchanger according to claim 35 wherein the refrigerant flow crossing device comprises a main block provided in left and right opposite sides thereof with respective recessed portions having fitted therein a right end of the left tank and a left end of the right tank respectively, and two flow direction changeover plates fitted respectively in the opposite recessed portions of the main block and each interposed between said end of the tank and a bottom face of the recessed portion, the main block having forwardly or rearwardly elongated two communication holes formed therein and vertically spaced apart for causing upper parts of the opposite recessed portions, as well as lower parts thereof, to communicate with each other, the two flow direction changeover plates having through holes formed therein for causing the inflow header of the left tank to communicate with the outflow header of the right tank and causing the outflow header of the left tank to communicate with the inflow header of the right tank.

37. A heat exchanger according to claim 36 wherein the flow direction changeover plate at the left has a through hole formed therein for causing the inflow header of the left tank

to communicate with one of the communication holes of the main block, and a through hole formed therein for causing the outflow header of the left tank to communicate with the other communication hole of the main block, and the flow direction changeover plate at the right has a through hole formed therein for causing the inflow header of the right tank to communicate with said other communication hole of the main block, and a through hole formed therein for causing the outflow header of the right tank to communicate with said one communication hole of the main block.

38. A heat exchanger according to claim 34 wherein each of the left and right tanks comprises a first member having heat exchange tubes joined thereto, and a second member brazed to the first member at a portion thereof opposite to the heat exchange tubes, the partitioning means being integral with the second member.

39. A heat exchanger according to claim 32 wherein the heat exchange tubes in each of the tube groups are at least seven in number.

40. A refrigeration cycle comprising a compressor, a condenser and an evaporator, the evaporator comprising a heat exchanger according to any one of claims 32 to 39.

41. A vehicle having installed therein a refrigeration cycle according to claim 40 as a motor vehicle air conditioner.